

1 **TITLE: MOTOR VEHICLE DOOR ATTACHMENT AND DETACHMENT**
2 **SYSTEM AND METHOD**

3 This is a continuation in part application of U.S. Patent application (Serial No.
4 / ____,) filed on November 7, 2003.

5 **BACKGROUND OF THE INVENTION**

6 **1. Field of the Invention:**

7 This present invention generally relates to motor vehicle door attachment systems,
8 and more particularly to attachment system that allow the door to be easily removed from the
9 motor vehicle after an accident.

10 **2. Description of the Related Art:**

11 Every year there are approximately 42,000 crash deaths. Half of the victims die
12 without even being transported to a medical treatment facility! There are 250,000 life
13 threatening injuries, 500,000 hospitalizations, 2,000,000 disabled by injuries and 4,000,000
14 emergency department visits occur that are due to motor vehicle related accidents. In
15 America alone, excluding Europe and other countries, nearly 17 million crashes that involve
16 27 million vehicles occur yearly. Motor vehicle accidents injuries result in about \$ 100
17 billion in economic cost. \$350 billion is the cost to the national economy that also includes
18 value for pain and suffering of people involved.

19 After a motor vehicle accident, it is important to remove the injured driver and
20 passengers from the motor vehicle very quickly and without causing further injury.


21 The life threatening injuries that result from serious crashes in the US each year are:
22 70,000 Brain injuries, 4,400 Neck and Spinal Cord injuries, 80,000 Chest and abdominal
23 injuries that include Heart, Lungs, Spleen, Liver and Kidneys. 18,000 Hip and Pelvic

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1 Injuries, 35,000 Leg, Ankle and Foot injuries.

2 In many other countries, due to road infrastructure limitations and uncontrolled traffic
3 mix, there are considerably higher rates of crash injury/fatality involvements as compared to
4 U.S. rates. Therefore, this invention has a global applicability as an improved safety measure
5 for various motor vehicle emergency conditions.

6 Structural damage makes the access to the injured very difficult for the rescue
7 personnel and often requires heavy duty forced entry and rescue spreading devices for
8 moving and cutting of the damaged motor vehicle parts. Such a process of cutting and
9 spreading rescue means is time consuming and entails additional dangers for the injured.
10 Whereas, often the injured within a motor vehicle must be rescued with utmost care, for
11 example in the case of neck injuries - the injured must be moved slowly only by medical
12 experts - that may involve two rescuers working on one injured person, who therefore would
13 need extra room to make the special maneuvers successfully. Otherwise, the injured can be
14 paralyzed for life.

15 These safety hazards that occur after accidents, have created a need for an emergency
16 vehicle exit apparatus to automatically enable the vehicle doors to be detached from being
17 jammed in the deformed motor vehicle body. Even if doors can be opened, it is still better to
18 have the extra room for faster rescue operations. Even if the doors open after an accident,
19 doors can still be obstacles against effective rescue operations, if doors remain attached to the
20 damaged motor vehicle. In two door motor vehicles, the ability to remove the doors becomes
21 even more critical for the rescue operations.

22 In view of the disadvantages of the prior art types of rescue equipment and methods
23 that are mostly devices applied externally, as forced entry devices, heavy duty hydraulic

1 forced entry-spreading devices, there is a need for a motor vehicle accident rescue system that
2 saves time in the efforts of rescue operations and is part of the vehicle.

3 This system can be built by original equipment manufacturer for new vehicles at
4 factory and may also retrofit older vehicles with some considerable auto mechanics work by
5 licensed auto mechanics.

6 Former motor vehicle hinge and door systems do not have a fast and reactive removal
7 mechanism for after accident emergency conditions that achieves a swift separation of doors.

8 A search in this field indicated that there is no prior art directly germane to the present
9 invention.

10 SUMMARY OF THE INVENTION

11 It is an object of the present invention to provide a motor vehicle door attachment and
12 detachment system that provides an immediate and visible escape route out of a damaged
13 motor vehicle.

14 It is another object of the present invention to provide such a system that enables swift
15 detachment of the doors, and by removal of the doors, it enables freeing vehicle occupants
16 who are injured and trapped or not trapped but only injured in a vehicle and also to provide
17 the extra room to perform better rescue operations, even if the doors are damaged, wherein
18 the damage can also be the result of any kind-angle- of side impact, other than the front or
19 rear end impacts, and can result in the doors being jammed.

20 It is further an object of the invention to provide such a system that includes an
21 automatic expulsion system that completely removes the doors from the motor vehicle.

22 It is further an object of the present invention to provide a such a system new rescue
23 that is relatively inexpensive to manufacture and install and does not require fundamental

1 structural changes to the motor vehicle design.

2 It is further an object of the present invention to provide such a system which is
3 subject of a low cost OEM production and application on OEM vehicles, with regard to
4 materials, technological methodology and labor, and accordingly is then subject of low prices
5 of sale to the consuming public, thereby making said device for motor vehicle accidents
6 economically available to the end users.

7 It is further an object of the invention to provide such a system that does not require
8 the use of nuts and bolts to attach or detach doors and closures and does not need removal of
9 the hinges at factory assembly-paint- and paint and body repair shops.

10 It is further an object of the invention to provide such a system that enables immediate
11 detachment of the doors that could be activated by the vehicle operator with a protected
12 button internally, as for example when the vehicle is not moving but catches fire or when the
13 vehicle is trapped.

14 It is further an object of the invention to provide such a system that can be easily
15 retrofit on some older model motor vehicles.

16 It is further an object of the invention to provide a method for loading and unloading
17 cargo that uses a door attachment and detachment system that allows the doors to be easily
18 attached and detached from the motor vehicle.

19 These and other objects of the invention are met by the motor vehicle door attachment
20 and detachment system disclosed herein, which comprises an intermediate member located
21 inside a cavity formed on a vertical frame member located adjacent the doorway on motor
22 vehicle. Attached to the external surface of the intermediate members are upper and lower
23 hinge elements designed to attach to compliment hinge elements attached to the door. The

1 intermediary member is disposed inside a cavity formed on the vertical frame member. The
2 intermediary member is selectively held inside the cavity by an electro-mechanic unlocking
3 system that is coupled to a sensor located in the motor vehicle. In a second embodiment, the
4 system includes an optional intermediate expulsion means used to force the intermediate
5 member out of the cavity immediately after the electro-mechanic locking and unlocking
6 system releases the intermediate member from the vertical frame member.

7 In the preferred embodiment, the intermediate member is a rectangular structure with
8 two tongue slot openings formed on its top and bottom surfaces. The electro-mechanic
9 locking and unlocking means comprises of two locks located inside the cavity opposite the
10 top and bottom surfaces when the intermediate member is disposed inside the cavity. Each
11 lock includes a moveable tongue that moves longitudinally to engage and disengage the
12 tongue slot formed on the adjacent surface of the intermediate member.

13 These two locks are designed to keep the intermediate members onto which door
14 stationary hinge sides are fixed, in their respective cavities, as if these are permanent parts of
15 the main body of the vehicle, when the vehicle is not involved in an accident. During an
16 accident, the sensory system activates the locks to swiftly move the tongues out of the tongue
17 slots thereby disconnecting the intermediate member from the cavity.

18 When the intermediate members are disconnected from the cavities, the doors become
19 detachable from the motor vehicle along with stationary hinge connections side, and door
20 hinge sides, whether the door hinges are damaged as a result of the accident and therefore
21 cause additional difficulty in opening the doors, or not. In the second embodiment, the
22 expulsion comprises a set of springs located between the inside surface of the vertical frame
23 member and the intermediate member. When the intermediate member is disconnected from

1 the vertical frame member, the spring forces the intermediate member outward from the
2 cavity thereby completely and automatically disengaging the door from the motor vehicle.

3 Located inside the cavity of the vertical frame member are guides that temporarily
4 keep the intermediate member aligned inside the cavity after the locks have released the
5 intermediate member. In the first embodiment, the guides are plastic fasteners that can be
6 broken when the intermediate member is manually forced outward from the cavity.

7 Before explaining the embodiments of the invention in detail, it is to be understood
8 that the invention is not limited in its application to the details of construction and to the
9 arrangements of the components set forth in the following description or depicted in the
10 drawings. The invention is capable of other embodiments and of being practiced and applied
11 in various other ways. Also, it is to be understood that the wording and terminology
12 employed herein are for the purpose of description and should not be regarded as limiting.

13 It should also be understood that the embodiments shown herein disclosed the
14 preferred embodiment of the invention and do not limit the invention. Therefore, those
15 skilled in the art will appreciate that the idea, upon which the disclosure is based, may be
16 utilized for the design of other systems and methods to apply for several purposes of the
17 present invention. Therefore, it is important that the claims be considered as including such
18 equivalent meanings.

19 This device and the method mentioned heretofore have novel features that result in a
20 new device and method for motor vehicle accidents, which is not anticipated, rendered
21 obvious, suggested, or even implied by any of the prior art rescue devices, either alone or in
22 any combination thereof.

23

DESCRIPTION OF THE DRAWINGS

Figure 1 shows in perspective view, the two locks used in the electro-mechanic locks and unlock system, that are within the front lower pillar and that are at locked, non - accident position, of which the locking function is to unlock the intermediate member, which in turn has the front door stationary part, upper and lower hinges fixed on it.

Figure 2 shows in perspective view, the electro mechanic locks being unlocked, as the motor vehicle gets into an accident and the locks that used to be within the intermediate members are swiftly moved to the unlocked position.

Figure 3 shows in perspective view, how the intermediate member onto which the front doors stationary part, upper and lower hinges are fixed, are removable after these are unlocked. This is first embodiment.

Figure 4 shows in perspective view how the intermediate member component gets expelled immediately by the second embodiment with the spring expulsion feature that is used instead of the plastic fasteners.

Figure 5 shows in perspective side view, how the doors has been removed as per first embodiment or has been automatically expelled as per the second embodiment and the medical rescue personnel are able to make a swift rescue operation that saves them valuable time.

Figure 6 is an enlarged perspective view of the intermediate member that can be removed and the hinges that are fixed on this intermediate member and therefore how the door can be removed out of from the pillars of the motor vehicle. Locking arms in the unlocked position also depicted.

Figure 7 is enlarged perspective view of the intermediate member and the hinges that

1 are fixed on this intermediate member. Also depicting the cavity out of which the
2 intermediate member is detached away from the plastic fasteners - this is the first
3 embodiment.

4 Figure 8 is a perspective view of the second embodiment depicting how the
5 intermediate member is expelled.

6 Figure 9 is a perspective view and depicts the electro mechanic device and the
7 intermediate member that hold the upper and lower hinges for the back doors with the side
8 pillars.

9 Figure 10 is a perspective view of the intermediate member on which the hinges are
10 fixed, how it gets detached from its cavity that is within the side pillars.

11 Figure 11 is a perspective view of the intermediate member of the side middle pillars,
12 on which the hinges are located.

13 Figure 12 is a front elevation view of the cavity and the intermediate member
14 depicting the additional space-depth needed for the spring members in the second
15 embodiment.

16 DETAILED DESCRIPTION OF THE INVENTION

17 With reference to Figure 1, the electro mechanic locks-solenoids 10 and 10a are
18 within front lower left and right front pillars 9, and are at locked non - accident position, of
19 which the lock tongues 11a and 11b keep the intermediate member 12 locked, onto which the
20 front doors upper stationary hinge part 12a and lower stationary hinge 12b are fixed on the
21 external surface. The electro-mechanic locks-solenoids 10 and 10a are capable of unlocking
22 the intermediate member 12 immediately onto which upper stationary hinge 12a and lower
23 stationary part 12b of the front door 12g are fixed. With regards to the parameters of

1 swiftness, the present invention activation, that is the unlocking mechanism can be compared
2 to the fastest air bag system. That means it would unlock within few milliseconds; in less
3 than 1/10 of a second, inclusive sensing the impact and completion of activation of
4 unlocking. In the second embodiment, intermediate member 12 is ready to be expelled out
5 by the springs 19a and 19b that are used in place instead of the plastic fasteners 13a and 13b.
6 In the second embodiment, the time for unlocking and expulsion of the intermediate
7 members 12 is as fast as the first embodiment, since the expulsion of the intermediate
8 members take place concurrently with respect to timing.

9 With reference to Figure 2, when the solenoid electro mechanic devices 10 and 10a
10 are activated by the accident sensor 8, in less than a second tongues, 11a and 11b are
11 unlocked and the intermediate member 12 is set free from tongues 11a and 11b. As locking
12 tongues 11a and 11b are out of the intermediate member 12, out of tongue cavities 13c and
13 13d, the intermediate member 12 can be detached easily from the cavity 13 that is out of the
14 front pillar 9 by the rescue personnel, whether the front door 12g is jammed at its frame or
15 not. In the second embodiment, intermediate member 12 gets expelled out automatically.

16 With reference to Figure 3, as the electro mechanic locking tongues 11a and 11b are
17 removed out of the intermediate member 12 and the intermediate member 12 is set free
18 from locking tongues 11a and 11b, this makes intermediate member 12 to be removed easily
19 out from its cavity 13 in the front lower pillars 9 of the vehicle, for the purpose to take the
20 font door 12g out. The slots, out of which tongues 11a and 11b become unlocked are 13c and
21 13d respectively. Since the intermediate member 12 has the door upper hinge 12a and lower
22 hinge 12b fixed on it, front door 12g can be removed out easily with minor effort that can
23 break the plastic fasteners 13a and 13b, these plastic fasteners are made by Emhart which is a

1 known company in automotive fastener market. An exact type of fastener for the purpose of
2 the invention can be produced by this company or by another fastener producer. Thus, even
3 if door 12g is jammed at the frame or there is damage to the door as well, the door 12g can
4 still be detached. The function of the plastic fasteners 13a, 13b are to temporarily hold the
5 intermediate member 12 after unlocking occurs. After unlocking, the intermediate member
6 12 and 14 are held stable by plastic fasteners 13a, 13b for intermediate member 12 and by
7 plastic fasteners 15a and 15b for intermediate member 14, temporarily. The plastic fasteners
8 13a and 13b are within the intermediate member cavity 13, where the inner surface of the
9 cavity 13 faces the front lower pillars 9 of the car. Likewise, the plastic fasteners 15a and
10 15b are within the intermediate member cavity 14, where the inner surface of the cavity 14
11 faces the middle pillars 9a of the vehicle.

12 With reference to Figure 4, in the second embodiment, instead of plastic fasteners
13 13a, 13b, there are expulsion springs 19a and 19b, which push out the intermediate member
14 12 immediately right after unlocking occurs.

15 With reference to Figure 5, after an accident with injured vehicle operator and
16 passengers, the vehicle has structural damage, but since the electro-mechanic devices 10, 10a,
17 10b and 10c have already unlocked the intermediate members 12 and 14 in less than a second
18 as the impact occurred, the front doors 12g and back doors 14g become removable and can be
19 removed out easily by rescue personnel after an accident, for quick freeing of the injured
20 vehicle operator and passengers, even if the doors 12g and 14g are jammed otherwise at their
21 frames and can not be opened.

22 With reference to Figure 6, the electro mechanic device 10 and 10a, move the
23 tongues 11a and 11b, out of slots 12h and 12i formed on the opposite ends of the

1 intermediate member 12. As the accident occurs, tongues 11a and 11b are immediately
2 moved out of lock slots 12h and 12i. Since the hinge 12a and 12b are fixed on the
3 intermediate member 12, in turn the front door 12g can also be set free and becomes
4 removable and can easily be detached out of the vehicle, as it is connected through the
5 stationary hinge parts 12a and 12b and through door upper hinge part 12e and door lower
6 hinge part 12f.

7 With reference to Figure 7, the intermediate member 12 can be seen as it is removed
8 out of its cavity 13. The cavity 13 is depicted just behind the intermediate member 12, out of
9 which intermediate member 12 has been removed. The cavity 13 has top and bottom
10 openings 13c and 13d above and below it, that enable tongues 11a and 11b to pass through
11 the wall of the cavity 13 and get into the lock slots 12h and 12i of intermediate member 12.
12 This figure shows the first embodiment.

13 With reference to Figure 8, the intermediary member 12 gets expelled by the
14 expulsion springs 19a and 19b used with the second embodiment. Each expulsion spring
15 19a, 19b includes one circle plate 20a and 20b, respectively, that presses against the
16 intermediate member 12.

17 With reference to Figure 9, the back doors 14g are also made easily removable after
18 an accident by applying the same system of electro mechanic unlocking. Upper side electro
19 mechanic lock 10b and lower side lock 10c and their tongues 17 and 18, are placed within the
20 middle pillars 9a of the automobile, tongues 17 and 18 keep the intermediate member 14 in
21 its cavity 15, in the locked position, when the vehicle is not involved in an accident. On the
22 external surface of intermediate member 14 are the upper back door hinge 14a and lower
23 door hinge 14b fixed. In the first embodiment, in an accident, the tongues 17 and 18 are

1 moved out in less than a second and the intermediate member 14 is only held by the plastic
2 fasteners 15a and 15b, which can easily be broken by the rescue personnel by pulling the door
3 out at the hinge sides. Same system is applied on both right and left back door 14g sides.

4 With reference to Figure 10, within the side pillars 9a are the cavities 15 -left and
5 right-, within which the intermediate member 14 is located. Intermediate member 14 gets
6 unlocked by electro mechanic tongues 17 and 18 when an accident occurs. Since the back
7 door upper stationary hinges 14e and lower hinge 14f are fixed on the intermediate member
8 14 through door hinges 14a and 14b, the door 14g becomes easily removable from the middle
9 pillar-body 9a of the vehicle. This is the first embodiment.

10 With reference to Figure 11, within the middle pillars 15, instead of the plastic
11 fasteners 15a and 15b, are the expulsion spring plates 20a and 20b that push against the
12 intermediate member 14. This shows the second embodiment.

13 With reference to Figure 12, in the second embodiment, within the cavity 13 is the
14 intermediate member 12 with the spring expulsion members 19a and 19b and their spring
15 plates 20a and 20b that push against the intermediate member 12. The depth of the cavity 13
16 has to be slightly greater to accommodate the expulsion springs 19a and 19b and their plates
17 20a and 20b. The extra depth of cavity 13 is depicted as length 20c. Same extra depth 20c
18 needed applies to the back door cavities 15 as well.

19 Also disclosed herein is of loading and unloading cargo from a motor vehicle
20 comprised of the following steps:

21 a. assembling a door attachment and detachment system on a motor vehicle, said
22 door attachment and detachment system including a door with an upper hinge element and a
23 lower hinge element, a vertical frame member located adjacent to a door opening on a motor

1 vehicle, said vertical frame member including a longitudinally aligned cavity, a removable
2 intermediate member located inside said cavity of said vertical frame member, at least two
3 complimentary shaped door hinge elements vertically aligned and securely attached to front
4 surface of said intermediate member capable of attaching to said upper hinge element and
5 lower hinge element on said door, two electro-mechanical locks located inside said cavity
6 formed in said vertical frame member, said locks being used to securely hold said
7 intermediate member inside said cavity of said frame member, and a sensor located in the
8 motor vehicle and coupled to said locks, said sensors capable of detecting an impact and
9 transmitting a signal to said locks to detach said intermediate member from said cavity when
10 an impact occurs

11 b. selecting cargo to be loaded into said motor vehicle;

12 c. detaching said intermediate member from said cavity of said vertical frame member
13 thereby enabling said door to be removed;

14 d. loading said cargo into said motor vehicle;

15 e. attaching said intermediate member to said vertical frame member to attach said
16 door to said motor vehicle;

17 f. delivering said motor vehicle to a desired location;

18 g. detaching said intermediate member from said motor vehicle to removed said door
19 from said motor vehicle;

20 h. unloading said cargo from said motor vehicle; and,

21 i. attaching said intermediate member to said motor vehicle to attach said doors to
22 said motor vehicles.

23